

it is a low elevation species, since there are very few locally established moths on the wing at that time at 1,500 m elevation.

In recent years, a number of typically Indo-Malayan Lepidoptera have been added to the known fauna of the Kumaon Himalaya (Smetacek 1994, 1995, 1998). While the paucity of comparative material from the 19<sup>th</sup> and first half of the 20<sup>th</sup> centuries from this area makes it uncertain whether the new records are recent arrivals or have been established here since the records began, in some cases it has been possible to suggest that some hawkmoths and at least one butterfly

(Smetacek 1994, 1995) are recent arrivals. In the case of *Pleurota falcata*, I would venture to suggest that it is a relatively recent arrival, probably sometime during the 20<sup>th</sup> century, since extensive work by a number of workers in the eastern Himalaya and the hills of northeast India during the 19<sup>th</sup> and 20<sup>th</sup> centuries failed to discover this moth.

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## 26. *CORYMICA* WALKER, LEPIDOPTERA: GEOMETRIDAE, IN THE KUMAON HIMALAYA, WITH THE DESCRIPTION OF A NEW FORM OF *C. DEDUCATA CAUSTOLOMARIA* MOORE

*Corymica* Walker is a small genus of Geometrid moths that occurs from the Indian subcontinent northward to Korea and Japan, and eastward to Sulawesi and Papua New Guinea. These moths are predominantly yellow, with relatively long palps and a distinctively shaped forewing, whose chief features are an acute apex and a dorsal margin with the distal half highly excised. Only males bear a large hyaline fovea near the base of the forewing.

Hampson (1895) and Prout (1915) assigned three species to the genus, while Wehrli (1940) took *vesicularia* Walker out of the synonymy in which these two authors placed it, and treated it as a valid species, raising the number of species to four. Wehrli (1940) also suggested that the taxa treated as subspecies of *specularia* Moore would probably prove to be a good species, which would increase the total number of species in the genus.

Hitherto, no moths of this genus had been reported from the Kumaon Himalaya, although *vitrigera* Butler was described from Dharamsala in Himachal Pradesh. This taxon was treated as a subspecies of *C. specularia* by Prout (1915) and as a synonym of the same by Hampson (1895), whose typical form is known from Bengal and the eastern Himalaya. So *vitrigera* or *specularia* was to be expected in the Kumaon

Himalaya, which lies between the two type localities.

However, in view of the observation by Wehrli (1940) on the subspecies of *specularia*, it is possible that *vitrigera* is, in fact, a good species, in which case both *specularia* and *vitrigera* may occur in Kumaon, the latter probably in the main Himalayan range, since the type locality, Dharamsala, is in the main range.

#### Location

The present study was carried out in the Kumaon Himalaya in the state of Uttaranchal. All records are from the Jones Estate in the Bhimtal Valley, 24 km from the district headquarters of Nainital. The elevation is c. 1,500 m above msl. The site lies in the outermost range of the Himalaya and constitutes the micro-watershed between the Bhimtal and Sattal lake systems.

The area is well forested, with the Himalayan oak (*Quercus leucotrichophora* A. Camus) and chir pine (*Pinus roxburghii* Sarg.) as nodal species, interspersed with elements of low elevation deciduous species, such as *Sapium insigne* Trim. and *Erythrina* L. spp. Other species include *Mallotus philippinensis* Muell. Arg., *Bauhinia* L. spp., *Phyllanthus* L. sp., *Pistacia* L. and *Ricinus* L. In addition, a large number of exotic trees and shrubs, such as tea *Nerium* L., and mango *Mangifera* L. make the area botanically diverse.

### Climate

The climate is subtropical, with a maximum summer temperature of *c.* 36 °C in late May and June and a minimum of 0 °C in January, although in some years the temperature does not fall below 6 °C. Rainfall is heavy, especially during the southwest monsoon from June to September. Relative humidity during this period is around 40%, while in March and April, it is generally less than 15%. Relative humidity mentioned in this paper was measured indoors unless otherwise mentioned, since it tends to vary greatly outdoors over short periods of time.

### Flying Time

Members of the Genus *Corymica* have been recorded in different years between March 1 and April 6 and again from June 2 continuously to November 14. During the warmer period of the year, these moths are not on the wing during most of April and May, when relative humidity varies between 1% and 20%, except on overcast days when it rises to 30% outdoors for a short while. It appears that these moths are not on the wing when humidity is less than 10%.

### Attractants

Moth populations have been monitored at the main study site in Jones Estate near Bhimtal for three decades. To study *Corymica*, the main attractant used was artificial light, a petromax during the early 1970s, and ordinary tungsten filament lamps of 60 W and 100 W, but most often mercury vapour lamps of 125 W or 160 W. These moths have not been recorded at flowers or other sources of sugar.

### Resting attitude

All members of this genus rest with the wings outspread. The forewings are contorted along their length, so that the costa is held furthest off the substrate and the remainder of the forewings slopes down to the hindwings, which are held level and close to the substrate. In this position, they seem to resemble a dried yellow leaf, curled along the edge, although the imitation is only a rough one and is not convincing if the moth is viewed away from a suitable backdrop.

These moths are proficient walkers and, upon settling, often walk a few centimetres with the wings outspread until they are satisfied and then settle down. It seems possible that they move about in order to settle in a certain position relative to the light source.

### Flight

The flight is weak and fluttering. These moths are incapable of gliding flight. They settle frequently. After

settling, if they are disturbed, they fly off but settle again a short distance away after a brief flight, usually lasting less than half a minute.

### Systematics

Four specimens of *Corymica specularia* collected during the 1970s were taken by the Late Fred Smetacek Sr. The remaining specimens were taken by the author. All specimens are in the author's collection.

### *Corymica* Walker

1860. Cat. Lep. Het. Brit. Mus. 20: 230.

### *Corymica arnearia* Walker

1860. Cat. Lep. Het. Brit. Mus. 20: 231.

**Material examined:** 2 exs. : 16.vii.1998 (female); 4.viii.2000 (male).

**Forewing Length:** 13 mm (mihi).

**Expanse:** 28 mm (male) (Hampson 1895); 30 mm (mihi).

**Distribution:** Khasis (Meghalaya); Thyetmyo; Upper Tenasserim (Myanmar); Borneo (Hampson 1895); N. India to Borneo, W. China, Korea, Nagasaki (Japan) (Prout 1915); also eastern marches of Tibet; S. China; Taiwan and Hainan. Flight period June (Wehrli 1940).

**Remarks:** The type specimen is from Sarawak and there appears to be no reported variation over this moth's vast range.

The present record extends the known distribution of the species westwards to Kumaon. On the whole, it appears to be a low elevation species, with records from Nagasaki in Japan and Guangdong in China.

It is noteworthy that only females have been recorded at Jones Estate. These two specimens are almost certainly individuals that journeyed quite far from their normal breeding grounds in the course of dispersing the species. The main population will probably be found in the Bhabar belt along the foot of the Himalaya and Jones Estate, at 1,500 m, is probably as high as the species ventures.

The specimens examined match Hampson's (1895) description, except in the matter of the medial spot on the forewing costa noted by him, which is lacking in the specimen examined, as well as in the illustration in Hampson (Fig. 101). There is a dark speck at the end of the cell on each wing in the specimens examined, which is not mentioned by Hampson (1895), although these specks appear in the illustration (Fig. 101) in the same work. The medial spot on the inner margin of the forewing is elongate in the specimens examined and encloses a very small white speck, much smaller than in the illustrations in Hampson (1895) and Seitz (1915).

***Corymica deducata* Walker**

1866. Cat. Lep. Het. Brit. Mus. 35: 1569.

**Material examined:** 3 exs.: *caustolomaria* Moore: 26.vii.2000, 30.vii.2000 (females). *wirthi* nov.: Holotype 20.x.1998 (male); paratype 19.x.2003 female. Leg. et coll. Peter Smetacek.

**Forewing Length:** 13 mm.

**Expanse:** 26 mm (Hampson 1895); 28 mm (mihi)

**Distribution:** Sikkim, Khasis (Meghalaya); Travancore (Kerala) (Hampson 1895); N. India to Korea, Japan and Formosa (Taiwan) (Prout 1915); also Sulawesi (Wehrli 1940).

**Remarks:** A new record for Kumaon. The type of *deducata* is from Sulawesi. Wehrli (1940), quoting an uncited work of Prout, suggested that *caustolomaria* is the Indian race of the species. He also noted that specimens from Hainan examined by him belonged to *caustolomaria*.

The species occurs in two forms in Kumaon. The typical form with a yellow ground colour and rufous markings is recorded in July (summer brood), while *wirthi* forma nov. is superficially very different, with the ground colour brown with fuscous markings and not a trace of yellow or rufous on both surfaces of the wings. On the *verso* surface, the costa of both wings is broadly paler, as is the inner margin of the forewing. The markings are identical to typical *caustolomaria* on both surfaces. It is the autumn form and appears not to have been recorded from anywhere in this insect's vast range. A similar difference in seasonal forms is evident in the European taxon *Eilicrinia cordiaria* Hübner, which is closely related to *Corymica*.

Wehrli (1940) noted that *caustolomaria* is on the wing in June and July in Hainan, and July in Korea. From this, it would appear to be univoltine in the northern part of its range, which rules out the very existence of an autumn form. However, it is possible that *wirthi* exists in Kerala, although there is no record of it so far. Wehrli (1940) noted that it is a rather rare species, so the lack of records is not unusual and *wirthi* might yet be discovered in Kerala. On the other hand, if it requires a degree of cold not found in Kerala, it might turn out to be restricted to the Himalaya.

The new form is named after Basil Wirth of Reading, U.K., who has worked on Indian Lepidoptera for nearly half a century.

***Corymica specularia* Moore**

1867, Proc. zool. Soc. Lond.: 649, pl. 33, fig. 11.

**Material examined:** 20 exs.: 1.iii.1974 (female); 10.iii.1977 (female); 6.iv.1999 (female); 13.iv.1981 (male); 20.iv.1992; 1.viii.1973 (female); 1.viii.1992 (female); 7.viii.1997 (female); 10.viii.1995

(male+female)x2; 12.viii.1977 (female); 16.viii.1995 (female); 27.viii.1983 (female); 29.viii.1983 (female); 30.viii.1981 (female); 8.ix.1983 (female); 15.ix.1992 (female); 18.ix.1998 (male); 10.x.1998 (female); 14.xi.1998 (female).

**Forewing Length:** 16-20 mm.

**Expanse:** Males 30-34 mm, females 38 mm (vide Hampson 1895); males 34 mm, females to 42 mm (mihi).

**Distribution:** Japan; Dharamsala (Himachal Pradesh); Sikkim; Nilgiris (Tamil Nadu); Sri Lanka (Hampson 1895). Widespread in India, Japan (Prout 1915). Various localities in China, India, Japan (Wehrli 1940).

**Remarks:** This is the commonest member of the genus at the study site. In addition to the above specimens, this species has been recorded in June and July. It is on the wing in November only during warm years, such as 1998 and 1999. In 2000, which was a rather cool year due to the prolonged southwest monsoon, the moth was not recorded after October 18, while in 1998 it was recorded nearly a full month later on November 14. The above statement takes into consideration the possibility that the species was on the wing in November 2000, but was not attracted to the MV light at the study site, since not only *specularia* but no moths were attracted during most of the winter of 2000-2001, unlike 1998-1999 and 1999-2000. So far, no seasonal variation has been noted in this species.

The taxon *vitrigera* Butler, which was treated as a subspecies of *specularia* by Prout (1915) and Wehrli (1940) and as synonym of *specularia* by Hampson (1895) was described from specimens from Dharamsala in Himachal Pradesh, northwest of Jones Estate. Dharamsala is in the main Himalayan range, while Jones Estate is in the outermost range. Therefore, the genus probably occurs throughout the Himalayan range as far west as Dharamsala. However, I have not recorded it from any other location in Kumaon or Garhwal so far.

None of the specimens examined in the present study are *vitrigera*. The type of *specularia* is from "Bengal", so *specularia* occurs at least as far west as the Bhimtal valley where Jones Estate is situated. Unless it turns out that *vitrigera* is distributed along the main range and *specularia* along the foothills, *vitrigera* appears to have a rather restricted range.

**Discussion**

The present study extends the known distribution of *Corymica arnearia*, *C. deducata caustolomaria* and *C. specularia specularia* westwards to the Kumaon Himalaya. The two former taxa are rather rare at 1,500 m, although they are perhaps commoner at lower elevations. It is worthy of note that only females

of *arnearia* have been recorded from Jones Estate so far. These individuals probably wandered so high in the process of dispersing the species. In the case of *specularia*, it appears to be well established at this elevation and will probably be found to occur even higher.

The specimens examined in this study have been collected over a period of nearly thirty years. It will be noted that there are no records of *arnearia* and *deducata caustolomaria* prior to 1998. This should not be interpreted to imply that these two taxa were absent from the area prior to 1998, but that they were probably overlooked earlier, although I am more or less certain that they were not attracted to the artificial light at the main study site between 1993 and 1997, when I paid more attention to members of this family. It can safely be stated that both these species appear sporadically at 1,500 m, although they might be well established in a locality not very far from the main study site.

Hitherto, seasonal variation had not been noted in this genus. The form *wirthi* nov. of *C. deducata caustolomaria* differs from the typical form in much

the same way as the spring form of the European moth *Eilicrinia cordiaria* Hübner gen. vern. *roeslerstaumaria* Staudinger differs from the typical summer form. As in the case of *Corymica*, not all species belonging to *Eilicrinia* Hübner are seasonally dimorphic. The two genera are usually placed close together. I have treated *wirthi* nov. as a seasonal form of *caustolomaria* rather than as an aberration, despite the paucity of specimens and other supportive data. Given the similar trend in *Eilicrinia* and the rarity of this species over its entire range, it seems best to proceed in this manner.

It is possible that *virigera* will be found in the main Himalayan range in Kumaon eventually and that *C. specularia specularia* occurs further west along the outer ranges of the Himalaya.

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#### 27. ADDITIONAL RECORDS OF BUTTERFLIES FROM MAHARASHTRA

I would like to add the following butterflies to the list of those already known to occur in Maharashtra, within the erstwhile Bombay Presidency Area.

***Euploea klugi kollari*:** The species occurred regularly in the Colaba area of Mumbai from where I took 3 males and 2 females. Further, I took 2 males from Nalasopara and Tulsi Lake, north of Mumbai. At the time I did not consider *klugi* to be a great rarity, as we seemed to see them quite often. In those days, I never took many examples of the same species, being something of a conservationist, even before conservation became an issue. For this reason, I have only two females, as it is so similar to *E. core*. Being somewhat inexperienced then, I was unable to distinguish between *core* and *klugi* females in the field. I am certain that there was a small breeding colony in Colaba, as there were plenty of milkweed (*Calotropis*) plants close by. We were able to observe *Danais chrysippus*, *D. genuta* and *Euploea core core* in all their stages of development. My good friend of many years, Fr. A.E. Bean has also recorded a single male from Lonavala, Maharashtra.

All the *klugi kollari* were taken between May and October 1957 to 1961. As I have not been back to the area since then, I do not know if a breeding population still exists at Colaba. However, the occurrence of *klugi* at Nalasopara and especially Tulsi Lake, an area that I believe may now be protected should provide us with some hope. [Nalasopara is now built up, but Tulsi Lake is within the protected Sanjay Gandhi National Park — Eds]

***Neopithecops zalmora dharmia*:** I took a single male of this species in Mahabaleshwar on 21.x.1961. At that time, I was unaware that this species had never been taken in the area before. Both Wynter-Blyth (1957) and Evans (1932) report it from Sri Lanka, South India to Bengal and Kumaon to Burma (now Myanmar). It was only when I read Eliot and Kawazoes' book, BLUE BUTTERFLIES OF THE LYCAENOPSIS GROUP that I realised I might have something very special. Col. John Eliot was good enough to confirm the identity of the specimen in question a couple of years ago.

Fr. Bean, who has taken *zalmora* in other areas, has usually found it flying with *Megisba malaya*. The